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ABSTRACT

In Quiegolani Zapotec (QZ), a language spoken by approximately 3,000 people in Oaxaca, Mexico, words contain minimal consonant clusters of two or even three consonants, and most of these clusters show a decreasing scope of sonority. This violates sonority constraints proposed by Greenberg (1978) and further discussed by Bell and Saka (1983). QZ, like most Zapotec languages, has a lenis-fortis distinction among some of its consonants. However, this distinction is less clear in QZ than in other Zapotec languages and carries a lower functional load. After an introduction, this paper discusses the phonemes, consonants, vowels, prosodies, and consonant clusters in QZ. It is suggested that many of the unusual consonant clusters in QZ can be explained by the QZ tendency toward monosyllabic words. This tendency is seen clearly in Spanish loanwords. Typically, only some of the consonants of the unstressed syllables remain. Many words that are polysyllabic in other Zapotec languages have been reduced to one-syllable words in QZ by the same process. (JL)

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QUIEGOLANI ZAPOTEC PHONOLOGY

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1 Introduction

Quiegolani Zapotec[1] (henceforth QZ) words contain initial consonant clusters of two or even three consonants and most of these consonant clusters show a decreasing slope of sonority. This violates sonority constraints proposed by Greenberg in 1978 and further discussed by Bell and Saka (1983). This, however, is understandable when viewed from a diachronic perspective. This will be discussed in section 6.4.

Further, QZ, like most Zapotec languages, has a lenis-fortis distinction among some of its consonants. However, this distinction is less clear in QZ than in other Zapotec languages and carries a lower functional load.

2 Phonemes

The segmental inventory of QZ is given in (1).

(1)

Consonants:	Stops	p	t			k^y	k	k^w
		b	d			g^y	g	g^w
	Affricates		c	č	ç			
				ǰ				
	Fricatives	(f)	s		š		(h)	
			z		ž			
	Nasals	m	n					
	Liquids		l					
			r					
	Semivowels	w				y		

Vowels:	Simple		Laryngealized	
	i	u	i?	u?
	e	o	e?	o?
	æ	a	æ?	a?

[1] Quiegolani Zapotec is spoken by approximately 3000 people living in Santa María Quiegolani and two smaller towns in the district of Yáutepec, Oaxaca, Mexico. It is classified as part of the "Southern Group" of Zapotec languages. Data for this paper were gathered by Sue Regnier and her husband, Randy Regnier, from 1985-90 under the auspices of the Summer Institute of Linguistics. The principal language associates were Martín Hernández Antonio and his sister, Eva Hernández Antonio. I would like to thank Steve Marlett for his help with earlier versions of this paper and Barbara Hollenbach for her help in beating this paper into its final form. My husband, Randy, deserves special thanks for his contribution in collecting data, his helpful discussions of that data, and his invaluable computer expertise which he used in formatting this paper.

The symbol *b* represents a sound that is usually realized as a voiced bilabial fricative [β].

QZ has four contrastive tones: high-rising *(¹)*, high *(²)*, low-rising *(³)*, and low *(⁴)*.

3 Consonants[2]

QZ has 24 consonants in native words and two consonants, *f* and *h*, which occur only in loanwords. They are illustrated below in examples (2) and (3).

(2) Consonants in syllable-initial position

p	pa	'to where'
t	te	'one'
k	ko$^{?4}$	'side of'
k^{y}	k^{y}e-^{1}wan	'mirror'[3]
k^{w}	k^{w}eb^{3}	'new'
b	be^{4}	'echo'
d	da$^{?4}$	'mat'
g	gi^{4}	'embers'
g^{y}	g^{y}o^{2}	'rain'
g^{w}	-g^{w}a	'that'[4]
c	c-a^{2}	'POT-go'
č	či$^{?3}$	'ten'
č̣	č̣u^{1}	'belly of'
ǰ	ǰe^{2}	'day'
f	fald^{2}	'skirt' (from Sp. *falda*)
s	s-a^{2}	'FUT-go'
š	šu^{3}	'sepal'
h	hug	'juice' (from Sp. *jugo*)
z	za^{4}	'grease'
ẓ̌	ẓ̌i$^{?}$l^{3}	'cotton'
m	ma$^{?2}$	'animal'
n	no$^{?3}$	'1st exclusive'
l	lo$^{?4}$	'corral'

[2] QZ words not marked for tone indicate holes in my data.

[3] Known morpheme breaks are marked with a hyphen. Most QZ words are monosyllabic. In polysyllabic words stress almost always occurs on the last syllable. Stress is marked on polysyllabic words.

[4] Affixes are marked with a hyphen, as in *-d* 'negative (suffix)' and *ʂ-* 'POS (prefix)'.

r	ren^{4}	'blood'
y	yu$^{?4}$	'house'
w	wi$^{?2}$	'dance'

(3) Consonants in coda

p	yap^{4}	'chayote' (a fruit)
t	ǰit^{4}	'egg'
k	mæ$^{?}$k^{4}	'dog'
k^{y}	r-e$^{?}$k^{y4}	'HAB-burn'
k^{w}	—	
b	dob^{3}	'maguey'
d	bid^{1}	'scab'
g	bæg^{1}	'comb'
g^{y}	—	
g^{w}	—	
c	g^{y}æc^{4}	'cactus spine'
č	gič^{4}	'grinding stone'
ç	miç^{2}	'snail'
ǰ	me$^{?}$ǰ^{2}	'mountain lion'
s	nis^{4}	'water'
š	giš^{4}	'net'
z	do$^{?}$z^{2}	'young corn plant'
ž	gež^{2}	'hut'
m	da$^{?}$m^{2}	'large owl sp. with ears'
n	bæn^{4}	'mud'
l	ǰil^{4}	'comal'
r	dor^{3}	'pine needle'
y	g^{y}e$^{?}$y^{4}	'mountain'
w	bæw^{4}	'cloud'

3.1 Obstruents

3.1.1 Contrasts

p vs. *b:*

(4)	onset:	pe-ˈnak^{2}	'why?'	*vs.*	be^{4}-ˈnak^{2}	'still'
	coda:	dop^{4}	'intestinal gas'	*vs.*	dob^{3}	'maguey'

b vs. *w:*

(5)	onset:	bki$^{?}$t^{4}	'rainbow'	*vs.*	wkit^{4}	'toy'
	coda:	do$^{?}$b^{2}	'feather'	*vs.*	do$^{?}$w^{4}	'corn crib'

t vs. *d:*

(6) onset: te 'one' *vs.* de^{1} '2nd person'
coda: dut^{2} 'mucus' *vs.* dud^{3} 'breast'

k vs. *g:*

(7) onset: ko$^{?4}$ 'side of' *vs.* go$^{?}$b^{2} 'reed'
coda: mya$^{?}$k^{4} 'raven' *vs.* mṣa$^{?}$g^{3} 'tiny corn'

k^{y} vs. *g^{y}:*

The phoneme *g^{y}* does not occur in the coda of a syllable.

(8) onset: k^{y}e-'wan 'mirror' *vs.* g^{y}e^{4} 'rock'

k^{w} vs. *g^{w}:*

Neither of these phonemes is very common and neither has been found in a syllable coda. However, they are contrasted in these two words:

(9) nk^{w}æ$^{?}$t^{4} 'deaf person' *vs.* ng^{w}a$^{?}$n^{2} 'chili plant'

k vs. *k^{y}* vs. *k^{w}:*

(10) onset: bkun^{3} 'tortilla' *vs.* bk^{y}a$^{?2}$ 'necklace'
vs. bk^{w}æl^{2} 'corn husk'
coda: n-ak^{2} 'ST-be' *vs.* r-ze$^{?}$k^{y3} 'HAB-turn over'

g vs. *g^{y}* vs. *g^{w}:*

(11) onset: gal^{4} 'twenty' *vs.* gyag^{4} 'gourd' *vs.* -g^{w}a 'that'

c vs. *s:*

(12) onset: mcu$^{?3}$ 'mourning dove' *vs.* msi$^{?4}$ 'hawk'
coda: g^{y}æc^{4} 'cactus spine' *vs.* byæs^{4} 'canal'

c vs. *t:*

(13) onset: c-a^{2} 'POT-go' *vs.* tap^{4} 'four'
coda: g^{y}æc^{4} 'cactus spine' *vs.* g^{y}æt^{4} 'tortilla'

c vs. *č* vs. *č̣:*

(14) onset: r-cæ$^{?4}$ 'HAB-close' *vs.* čey^{2} 'Uncle (title)'
and co$^{?}$w 'slowly' *vs.* r-č̣o$^{?}$n^{4} 'HAB-throw'
coda: gic^{4} 'hair of' *vs.* gič^{4} 'grinding stone'
vs. gič̣ 'weeding'

č vs. *č̣:*

The phonemes *č* and *č̣* do not contrast in the onset (see section 3.1.2). However, they do contrast word-finally as in the following words:

(15) mi$^{?}$č^{3} 'grasshopper' *vs.* mi$^{?}$č̣^{4} 'crooked plant'

ǰ vs. *č* vs. *č̣:*

(16) onset: mǰin^{3} 'deer' *vs.* mčiz^{4} 'squirrel'
coda: meǰ^{4} 'seed' *vs.* ngeč^{2} 'yellow' *vs.* žeč̣^{4} 'onion'

č vs. *ṣ̌:*

(17) onset: čey^{2} 'Uncle (title)' *vs.* šen^{4} 'thing of'
coda: gič^{4} 'grinding stone' *vs.* giṣ̌^{4} 'net bag'

č vs. *t:*

(18) onset: čey^{2} 'Uncle (title)' *vs.* te 'one'
coda: gič^{4} 'grinding stone' *vs.* ǰit^{4} 'egg'

č̣ vs. *t:*

(19) onset: r-č̣o$^{?}$n^{4} 'HAB-water' *vs.* r-to$^{?4}$ 'HAB-sell'
coda: gič̣ 'weeding' *vs.* ǰit^{4} 'egg'

č̣ vs. *ṣ̌:*

(20) onset: č̣u^{1} 'belly of' *vs.* ṣ̌u^{3} 'sepal'
coda: mi$^{?}$č̣^{4} 'crooked plant' *vs.* mi$^{?}$ṣ̌^{4} 'chigger'

ǰ vs. *d:*

(21) onset: ǰi$^{?}$n^{2} 'work' *vs.* di$^{?}$n^{4} 'loan'
coda: meǰ^{4} 'seed' *vs.* ged^{4} 'tick'

ǰ vs. *ǯ:*

(22) onset: ǰi$^{?}$n^{2} 'work' *vs.* ǯi$^{?}$n 'son of'
coda: geǰ 'seven' *vs.* geǯ^{2} 'hut'

ṣ̌ vs. *ǯ:*

(23) onset: ṣ̌un 'eight' *vs.* ǯun^{4} 'thread'
coda: giṣ̌^{4} 'net bag' *vs.* giǯ^{4} 'leaf, grass'

s vs. *ṣ̌:*

(24) onset: bsu$^{?3}$ 'adobe' *vs.* bṣ̌uz^{4} 'priest'
coda: nes^{4} 'day-before-yesterday' *vs.* neṣ̌^{4} 'fruit'

z vs. *ǯ:*

(25) onset: zeg 'more-or-less' *vs.* ǯeč^{4} 'onion'
coda: giz^{2} 'sickness' *vs.* giǯ^{4} 'leaf, grass'

s vs. *z:*

(26) onset: bsu$^{?3}$ 'adobe' *vs.* bzu$^{?}$d^{2} 'cap'
coda: nis^{4} 'water' *vs.* niz^{2} 'corn'

3.1.2 Distributional restrictions

Fortis stops are uncommon in word-initial position. The consonant *p* is particularly rare there, occurring in only four morphemes outside of Spanish loanwords: *pa* 'where?', *pe* 'question particle', *pazer* 'perhaps', and *pæt*^{4} 'female genitalia'.

The consonant *k*^{y} occurs in word-final position in only four words which happen to be verb stems: *r-be*$^{?}$*k*^{y4} 'HAB-put', *w-e*$^{?}$*k*^{y4} 'COM-burn', *w-ze*$^{?}$*k*^{y4} 'COM-turn around', and *r-yek*^{y} 'HAB-revolve'. *k*^{w}, *g*^{y}, and *g*^{w} never occur in word-final position.

Consonants with lip-rounding *(k*^{w}, *g*^{w}, and *w)* do not occur before *o*, *o*$^{?}$, *u*, and *u*$^{?}$ in native QZ words, with one exception. When the completive aspect marker *w-* precedes a verb stem with initial *o* or *o*$^{?}$, some QZ speakers pronounce the *w*, and others do not, for example, *w-o*$^{?2}$ or *o*$^{?2}$ 'COM-drink'.

The consonants *y*, *k*^{y}, and *g*^{y} do not occur before *i* or *i*$^{?}$. Similarly, *i* and *i*$^{?}$ do not occur before final *y*.

As was shown in section 3.1.1 above, the phonemes *c*, *č*, *c̓*, and *ǰ* all clearly contrast in syllable coda position. However, in syllable onsets the consonants *č* and *ǰ* usually occur only before the vowels *e* and *i* (simple or laryngealized) in native QZ words. The consonants *c̓* and *c* generally do not occur before *e* and *i*. Two apparently native QZ words do not follow these generalizations: *čab*^{3} 'skirt' and *nwc̓eč*^{2} 'iguana'. Loanwords frequently do not follow these generalizations, as in *ča*^{2}*'mar*^{2} 'sweater' (Sp. *chamarra*) and *c̓er*^{2} 'scissors' (Sp. *tijeras*).

3.1.3 Lenis-fortis distinctions

The following lenis-fortis pairs exist: *p-b; t-d; k-g; k*^{y}*-g*^{y}*; k*^{w}*-g*^{w}*; č-ǰ; s-z;* and *š-ž*. In utterance-final position the distinction between members of these consonant pairs is generally lost, and both lenis and fortis members occur unvoiced with aspiration on stops and affricates. *p* and *b*, however, maintain their distinctiveness in this position, where *p* is [p^{h}] and *b* is the voiceless fricative [ɸ]. Even though members of a lenis and fortis pair generally sound the same in utterance-final position, a native speaker of QZ can probably distinguish the two by the length of the vowel before the consonant. The vowel is slightly shorter before a fortis consonant than before a lenis consonant or in an open syllable. The underlying distinction between lenis-fortis pairs in syllable coda position can be determined by adding the clitic pronoun *o*^{2} '3rd inanimate'. This places the consonant in intervocalic position where fortis consonants are voiceless and somewhat longer and lenis consonants are voiced and shorter. In this position *b* and *d* are pronounced as voiced fricatives, and *g* is a voiced stop. In utterance-initial position the lenis consonants tend to devoice and resemble their fortis counterparts. The degree of devoicing varies from speaker to speaker. As noted above, fortis stops are rare in word-initial positions (see section 3.1.2).

The affricates *c* and *c̓* are aspirated in utterance-final position. They do not have lenis counterparts.

In other languages of the Southern Zapotec group, the lenis-fortis distinction is much easier to hear. For instance, Marlett and Ward 1988 report that in Quioquitani Zapotec (a language closely related to QZ) the lenis-fortis consonants are clearly voiced and voiceless in the onset. A syllable-final consonant is easily identified as lenis or fortis by the length of the preceding vowel. I have heard Quioquitani Zapotec spoken and noticed that this vowel length is much clearer than in QZ. The subtler distinction between lenis and fortis consonants in QZ, and the fact that no two words in QZ are distinguished from each other only by a lenis-fortis distinction, leads one to believe that the

lenis-fortis contrast carries a smaller functional load in QZ than in other Zapotec languages.

Other Zapotec languages have fortis-lenis pairs for nasals and liquids (Butler 1980, Marlett and Pickett 1987, Nellis and Hollenbach 1980, Nellis and Nellis 1983, Stubblefield and Stubblefield 1991). Even in Mixtepec Zapotec, which is probably the Zapotec variant most closely related to QZ, Reeck has found fortis-lenis pairs for nasals and liquids (Reeck 1974). However, this distinction does not exist in QZ. The length of vowels preceding final nasals and liquids in QZ indicate that these consonants pattern as lenis.

3.1.4 Phoneme *b*

The consonant *b* acts more as a fricative than as a stop. In most environments it is pronounced [β]. It is pronounced [b] only when following *m* in a branching onset, as in *mbag*^{1} 'small iguana'. It is pronounced [ɸ] in utterance-final position and in a branching onset before a fortis consonant, as in *bčuʔš*^{3} 'tomato' [ɸčuʔuš^{3}]. When the possessive prefix[5] *š-* is added, as in [šaβ'čuʔuš^{3}] 'tomato of', the allophone [β] occurs since it is now in the coda. Where *b* occurs word-initially in a branching onset before a voiced consonant, it is preceded by a rounded vowel-sound, as in *bza*^{22} 'bean' [°β'zaʔa^{2}]. *b* is not devoiced, as are *d* and *g*, following the possessive prefix *š-*, as seen in [š-βič^{2}] 'cat of'.

3.2 Nasals

The consonant *n* is velar before a velar in a coda, as in the word *škil'ǰink* 'cricket'. Where *n* occurs before the consonants *w*, *g*^{w}, or *k*^{w} in a branching onset, the lip-rounding spreads onto the *n* as well. The following examples have been found.

(27)

nwčeč^{2}	'iguana'
ng^{w}laʔz^{2}	'frog'
ng^{w}læʔ^{4}	'blind person'
ng^{w}reg^{3}	'small lizard sp.'
ng^{w}aʔn^{4}	'medicinal plant sp.'
ng^{w}aʔn^{2}	'chili plant'
nk^{w}æʔt^{4}	'deaf person'
ng^{w}ziʔ^{2}	'thunder'
ng^{w}zan	'certain relatives'

[5]A noun prefixed by *š-* is possessed by someone or something. The possessor (noun or pronoun) follows the possessed word.

'nwṣider 'acorn woodpecker'
nwṣu^3 'grains that form on corn flowers'

The phonemes *n* and *m* are contrasted below.

(28) onset: mæz^4 'hornet' vs. næz^2 'path'
coda: da$^?$m^2 'large owl sp. with ears' vs. kba$^?$n^2 'weeding'

3.3 Liquids

Where *l* follows *t*, it has a voiceless allophone [ɬ]. This occurs only in three words.

(29) tla^3 'piece'
tlak^4 'tree sp.'
tlaz^2 'peach' (probably from Sp. *durazno*)

r is a voiceless trill in utterance-final position and in a branching onset before a fortis consonant. It is a voiced trill in a branching onset before a lenis consonant and a flap elsewhere.

(30) rner^2 'strainer' [r̥ner̥^{2}]
rsil^3 'early' [r̥sil]
ren^4 'blood' [ɾen^4]
w-ru$^?$^{4} 'COM-leave' [u'ɾu$^?$u^4]

The phonemes *l* and *r* are contrasted below.

(31) onset: lo$^?$^{4} 'corral' *vs.* ro$^?$ 'big'
coda: dol^4 'sin' *vs.* dor^3 'pine needle'

3.4 Semivowels

The semivowels *w* and *y* are pronounced as voiceless syllabic vowels in a branching onset before a fortis consonant. They are pronounced as the voiced vowels [u] and [i] respectively in branching onsets before lenis consonants. However, they still function as consonants, carrying no tone of their own. And when words beginning this way are hummed, they are hummed as one syllable. This is discussed further in section 6.5.

y is voiceless in utterance-final position. *w* is pronounced as a short [u] in utterance-final position. Elsewhere, they are pronounced [w] and [y].

(32)

wkit^4	'game'	[U'kit^4]
y-ka^3	'POT-buy'	[I'ka^3]
wna$^{?4}$	'woman'	[u'na:$^{?4}$]
yẓe	'tomorrow'	[i'ẓe]
mey^3	'mushroom'	[me^{i}y^3] ~ [me^{i}Y^3] (in utterance-final position)
bæw^4	'cloud'	[βæ^{u4}]
wi$^{?2}$	'dance'	[wi$^?$i^2]
yu$^{?2}$	'bundle'	[yu$^?$u^2]

Semivowels following laryngealized vowels have an effect on the vowel quality. A laryngealized vowel in QZ is usually pronounced as a vowel broken by a glottal stop, as in [βa$^?$a^2] 'grave' and [βo$^?$o^3] 'coal'. However, in words where a laryngealized vowel is followed by *y* or *w*, the vowel is not re-articulated after the glottal stop. Instead, the glottal stop is followed by the semivowel which phonetically is almost syllabic, as shown in example 33.

(33)

kba$^?$y^4	[kβa$^?$i^4]	'broom'	mæ$^?$w^3	[mæ$^?$u^3]	'moon'
g^{y}e$^?$y^4	[g^{y}e$^?$i^4]	'mountain'	g^{y}o$^?$w^2	[g^{y}o$^?$u^2]	'river'
me$^{2'}$ç̣u$^?$y^2	[me$^{2'}$ç̣u$^?$i^2]	'small owl'	do$^?$w^4	[do$^?$u^4]	'corn bin'

That these words end in a consonant is clear in sentences where they are followed by the third inanimate pronoun, which takes the form *we* following a vowel (as in *be^4 we* 'It's an echo.') and *o^2* following a consonant. In all cases of [V$^?$i] and [V$^?$u] the form *o^2* follows, as it does when *y* or *w* follow a simple vowel.

(34) Examples:

[me^{i}y^3]	mey^3	'mushroom'	['me$^{i3'}$yo^2]	mey^3 o^2
[me$^?$i^2]	me$^?$y^2	'mole'	['me$^?$i$^{2'}$yo^2]	me$^?$y^2 o^2
[βæu^4]	bæw^4	'cloud'	['βæ$^{u4'}$wo^2]	bæw^4 o^2
[mæ$^?$u^3]	mæ$^?$w^3	'moon'	['mæ$^?$u$^{3'}$wo^2]	mæ$^?$w^3 o^2

3.5 Complex segments

Decisions to treat ambiguous sequences as one or two phonemes are based on two criteria. First, if these are treated as two phonemes, will it produce a cluster of three consonants? All unambiguous clusters of three consonants in QZ begin with *n*. I have chosen an analysis which does not produce any clusters of three consonants beginning with a phoneme other than *n*.

The following segments are treated as single phonemes on the basis of this criterion: *k^y*, *k^w*, *g^y*, *g^w*, *c*, *č*, *ç̣*, and *j*. The list below shows examples of words which would have produced clusters of three consonants if these had

been treated as sequences of two phonemes. The example for g^w would have produced a cluster of four consonants.

(35) bk^{y}a$^{?2}$ 'necklace'
bk^{w}al^2 'corn husk'
lg^{y}e$^?$y^4 'market'
ng^{w}reg^3 'small lizard sp.'
bcaz^2 'gourd strainer'
mčiz^4 'squirrel'
bčų$^?$š^3 'tomato'
mǰin^3 'deer'

The second criterion is whether these segments act as one or two phonemes when preceded by the possessive prefix *ṣ-*. When this prefix is added to an unambiguous simple onset, it forms a cluster of two consonants.

(36) ṣ + CV(C) = ṣCV(C)
example: ṣ + bič^2 'cat' = ṣbič^2

However, when the possessive prefix is added to an unambiguous consonant cluster, the vowel *a*, with a low tone, is inserted between *ṣ-* and the consonant cluster. (Some speakers insert the vowel *e* instead.)

(37) ṣ + CCV(C) = ṣaC'CV(C)
example: ṣ + bdu$^{?2}$ 'banana' = ṣab^4'du$^{?2}$

The examples below show the phonemes k^y, k^w, g^y, g^w, and *c* preceded by the possessive prefix. Each clearly acts as a single phoneme.

(38) ṣ + k^{y}e-'wan 'mirror' = ṣk^{y}e'wan
ṣ + k^{w}art^2 'room' = ṣk^{w}art^2 (from Sp. *cuarto*)
ṣ + g^{y}e^4 'rock' = ṣk^{y}e^4
ṣ + g^{w}ay 'beast of burden' = ṣk^{w}ay (from Sp. *caballo* 'horse')[6]
ṣ + ca^4'k^{w}et^2 'basket' = ṣca^4'k^{w}et^2

For *č, ǰ,* and *c̓,* however, this criterion cannot be used because QZ has a constraint against the sibilant clusters that would be produced. The conflict is resolved in the case of *č* and *ǰ* by deleting these consonants following *ṣ-*. In the case of *c̓*, the conflict is resolved either by deleting *c̓* or by inserting the vowel *a*. However, only one example of this has been found to date.

[6]The voiced consonants g^y and g^w are devoiced following the possessive prefix *ṣ-* becoming k^y and k^w respectively.

(39) š + ǰil^4 'comal' = šil^4
š + čab^3 'skirt' = šab^3
š + čer^2 'scissors' = ša^4'čer^2 ~ šer^2 (from Sp. *tijeras*)

The following sequences are treated as consonant clusters because they do not occur in any clusters of three consonants and because they require an epenthetic vowel when preceded by the possessive prefix: *by, bw, my, ny, ly,* and *ry.*

(40) š + byæk^2 'jug' = šab^4'yæk^2
š + bwi^2 'guava' = šab^4'wi^2
š + mya$^?$k^4 'raven' = šam^4'ya$^?$k^4
š + nyeb^2 'snow' = šan^4'yeb^2 (from Sp. *nieve*)
š + lyu^4 'land' = šal^4'yu^4
š + ryent^2 'mescal' = šar^4'yent^2 (from Sp. *aguardiente* 'rum')

4 Vowels

There are six vowels in QZ. All six vowels exist in simple and laryngealized forms.

4.1 Contrasts

The six simple vowels are contrasted below.

(41)	a	ma^4'ba^4	'chipmunk'	g^{y}a	'above'
	e	me^4	'aphid'	g^{y}e^4	'rock'
	æ	mæ^4	'crab'	g^{y}æt^4	'tortilla'
	i	mig^3	'monkey'	—	
	o	—		g^{y}o^2	'rain'
	u	muš	'Aunt (title)'	g^{y}ut^4	'squash'

Laryngealized vowels are pronounced with a clear glottal stop between two equal vowels except when followed by a semivowel or *n* (see sections 3.4 and 4.3, respectively) or when they occur with a low tone *(*^{4}*)* in an open syllable, as discussed in section 4.3. Simple and laryngealized vowels are contrasted below.

(42)	Simple		Laryngealized	
	ṣla^{4}	'yard'	ṣla$^{?3}$	'fever'
	meǰ^{4}	'seed'	me$^{?}$ǰ^{2}	'mountain lion'
	g^{y}æl^{2}	'corn plant'	g^{y}æ$^{?}$l^{2}	'night'
	gič^{4}	'grinding stone'	gi$^{?}$č^{4}	'paper'
	dob^{3}	'maguey'	do$^{?}$b^{2}	'feather'
	yu^{4}	'dirt'	yu$^{?4}$	'house'

4.2 Distributional restrictions

Both simple and laryngealized vowels occur only singly and never in clusters.

The vowels *i* and *i$^{?}$* do not occur before *y*, and *u* and *u$^{?}$* do not occur before *w*.

The vowels *æ* and *æ$^{?}$* have a somewhat limited distribution. They never follow *k, g, č, ǰ,* or *ṣ;* nor precede *p, b, č, ç, ǰ, ṣ, ẓ,* or *y*. However, they are very common in other environments. I have no explanation to offer for these distributional facts.

4.3 Variant forms of vowels

In a closed syllable a simple vowel is slightly shorter before a fortis consonant than it is before a lenis consonant or in an open syllable. However, I am unable to hear this distinction until the words are hummed (see section 3.1.3).

Before *n*, a laryngealized vowel is pronounced [V$^{?}$n̩].That is, the glottal stop is followed by a syllabic *n*, and the vowel is not repeated. This is seen in the word *či$^{?}$n^{4}* 'thirteen', which is pronounced [či$^{?}$n̩^{4}], not [či$^{?}$in̩^{4}].

A laryngealized vowel with a low tone *(4)* is pronounced [V:$^{?}$] in an open syllable. That is, the vowel is lengthened before the glottal stop and is not re-articulated. Utterance-finally the glottal stop is followed by an aspirated release.

(43)	yu$^{?2}$	'bundle'	[yu$^{?}$u^{2}]
	yu$^{?4}$	'house'	[yu:$^{?h4}$] ~ [yu:$^{?4}$] (if not utterance-final)

5 Prosodies

5.1 Stress

The vast majority of QZ morphemes are monosyllabic. Most of the two-syllable words we have recorded are known to be either compounds or Spanish loanwords. It is possible that the remainder are also. When two-syllable words occur, the stress is on the second syllable, as in *ca⁴'kʷet²* 'basket'. The exception to this rule is the word *'nwṣider* 'acorn woodpecker', where stress falls on the first syllable. It is possible that, in fact, this is a one-syllable word, *nwṣidr*. Such an analysis would, however, give us a new syllable type, CCCVCC, and a new consonant cluster, *dr*. It is also possible that this word is onomatopoeic, reflecting the call of the acorn woodpecker, which has no regard for QZ stress rules.

5.2 Tones

All four tones are contrastive in words with simple vowels which are either open or end with a lenis consonant.

(44)

V^1 *vs.* V^2	niw¹	'sour'	niw²	'maggot'
V^1 *vs.* V^3	bid¹	'scab'	bid³	'closed'
V^1 *vs.* V^4	bæg¹	'comb'	bæg⁴	'pole'
V^2 *vs.* V^3	gʸo²	'rain'	gʸo³	'lime'
V^2 *vs.* V^4	gʸæl²	'corn plant'	gʸæl⁴	'sandal'
V^3 *vs.* V^4	gʸæl³	'grass'	gʸæl⁴	'sandal'

High tone *(²)* and low tone *(⁴)* show no distributional restrictions and contrast with each other in many pairs. The low-rising tone *(³)* is found in all environments except on a simple vowel before a fortis consonant.

The high-rising tone *(¹)* is by far the least common. It occurs only on simple vowels in open syllables or simple vowels followed by a lenis consonant.

6 Consonant clusters

QZ has many consonant clusters, especially in the onset.

6.1 Syllable patterns

QZ syllables can be open or closed. Syllable onsets can include up to three consonants. Codas rarely have a cluster of two consonants.

(45) **Syllable patterns**

open:	V	u^{4}	'COM-eat'
	CV	gu^{4}	'potato'
	CCV	bza$^{?2}$	'bean'
	CCCV	nwšu^{3}	'grains that form on corn flowers'
closed:	VC	iz^{2}	'year'
	CVC	yag^{2}	'tree'
	CCVC	bžil^{4}	'spark'
	CVCC	ku^{1}'tens^{3}	'sack'
	CCVCC	mtilt^{3}	*'jícama'* (snow potato)
	CCCVC	ngba$^{?}$n^{2}	'thief'

All of these patterns can occur with either simple or laryngealized vowels.

6.2 Rare patterns

The VC and V patterns are rare in native QZ words, to my knowledge being found only in *iz*^{2} 'year' and certain verbs in the completive aspect. The roots of these verbs all start with *u, u?, o,* or *o?*. When the completive aspect marker *w-* is added to these roots, it is not pronounced[7]. So the completive form of the verb *u*^{4} 'eat' is pronounced [u^{4}], not [wu^{4}].

Clusters of three consonants (in CCCV and CCCVC syllables) are not common. They have been observed in eleven words, each beginning with *n.* These words are listed in section 6.6.

Syllables ending in consonant clusters (CVCC and CCVCC) are also uncommon. These are discussed in section 6.7.

6.3 Two-consonant clusters in the onset

Table 1 shows all the clusters of two consonants found in the onsets of QZ words. Table 2 gives examples of those clusters. In Table 1 the first consonant in the cluster is shown in the vertical column, while the second consonant is listed across the top and bottom of the chart. Clusters marked "N" occur in simple, free nouns. In clusters marked "P" the initial *š* is always the possessive prefix *š-*. In clusters marked "A" the initial consonant is an aspect marker before a consonant-initial verb root. Clusters marked "L" occur only in Spanish loanwords. Clusters that occur on other kinds of words are marked "O".

[7]Some QZ speakers pronounce the *w* before *o* and *o?*. See section 3.1.2.

It is quite possible that some of the clusters marked "N" consist of what historically were two separate morphemes now reduced to a single word. And some clusters marked "O" historically consisted of aspect markers attached to roots other than verbs which have now become distinct words. Such is the nature of QZ.

Table 1: Clusters of two consonants in onsets

	p	t	k	k^y	k^w	b	d	g	g^y	g^w	c	č	č̣	j̆	s	š	z	ž	m	n	l	r	y	w
p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	-	L
t	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	-	N	L	-	-
k	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	L	-	-
k^w	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-
b	-	N	N	N	N	-	N	-	-	-	N	N	N	N	N	N	N	N	-	N	N	N	N	N
d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	-
g	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O	A	A
g^w	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-	-	O	-	-	O	-
f	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L
s	-	O	A	A	L	A	-	-	-	-	-	A	-	-	-	-	-	-	-	A	A	A	A	A
š	O	N	N	P	O	P	-	-	-	-	P	-	-	-	N	-	-	-	P	O	N	-	O	N
m	-	N	N	-	-	N	N	N	N	-	N	N	N	N	N	N	N	N	-	-	N	N	N	-
n	-	O	A	A	N	-	N	N	N	N	A	A	A	O	A	A	N	O	-	-	O	A	N	A
l	-	-	-	-	-	N	-	-	N	-	-	-	-	-	-	N	N	-	L	N	-	-	N	-
r	-	A	A	A	-	A	A	A	A	-	A	A	A	A	O	A	O	A	L	A	A	-	A	A
y	-	A	A	A	-	N	N	A	A	-	A	A	A	A	A	N	N	O	-	A	N	N	-	-
w	-	A	N	A	-	-	A	A	A	-	A	O	A	A	A	A	O	A	-	N	A	A	A	-
	p	t	k	k^y	k^w	b	d	g	g^y	g^w	c	č	č̣	j̆	s	š	z	ž	m	n	l	r	y	w

There are many gaps in Table 1. The following paragraphs discuss some of these gaps.

There are no consonant clusters beginning with *k^y, d, g^y, c, č, č̣, j̆, z,* or *ž.*

Note that the cluster *wb* does not occur. When the completive aspect marker *w-* is attached to a verb root beginning with *b,* a metathesis occurs producing a cluster of *bw,* as in *bwij̆*^{2}, the completive form of the verb root *bij̆*^{2} 'dry'.

Where *n* occurs before *b,* as in the stative marker *n-* attached to a root beginning with *b,* the *n* becomes *m,* as in *m-ban*^{1} 'ST-live'. Thus, no *nb* consonant clusters exist. However, *n* does not assimilate before *k* or *g* syllable-initially, as seen in *nkal*^{1} 'dark' and *ngup*^{4} 'armadillo'.

When the possessive prefix *š-* is placed before a noun beginning with *r,* the *r* is deleted. No *šr* cluster is produced. Thus, the possessed form of *ren*^{4} 'blood' is *šen*^{4}, not *šren*^{4}.

A number of the holes in this chart can be accounted for by the sibilant cluster constraint mentioned in section 3.5. *č, ç, ǰ,* and *ǯ* are deleted following *ș*. The consonant *z* is devoiced following *ș*.

The following clusters, *sc, sç, sǰ, sș, sz,* and *sǯ,* are also absent. *c* and *z* are deleted following *s*. The underlying clusters *sç, sǰ, sș,* and *sǯ* all surface as *ș*.

Voiced stops, except for *b*, are devoiced after *ș-*, as in *ș* + *g^{y}e^{4}* 'rock' becoming *șk^{y}e^{4}*. The phoneme *b* remains a voiced fricative, as in *ș-bič^{2}* 'POS-cat' [ș**ß**ič^{2}].

Certain clusters which could be treated as sequences of three consonants are treated here as sequences of two with an intrusive stop in the phonetic representation. For example, where *m* occurs before *ǯ, l,* or *r,* a [b] is automatically inserted between them.

(46) mǯi$^{?}$z^{2} 'coati' [m'bǯi$^{?}$is^{2}]
mlag^{3} 'butterfly' [m'blak^{3}]
mre^{4} 'ant' [m'bře^{4}]

m occurs before the following consonants without a [b] being inserted: *t, k, b, d, g, g^{y}, c, č, ç, ǰ, s, ș, z,* and *y*.

Also, where *n* occurs before *ǯ,* a [d] is automatically inserted, as in *nǯo$^{?2}$* 'big', pronounced [n'dǯo$^{?}$o^{2}]. (If this were analyzed as *njo$^{?2}$,* it would be the only word we've found where *ǰ* precedes a vowel other than *e* or *i*.) A *d* is also inserted between *n* and *r* where they occur contiguously across morpheme boundaries, as in *men^{1} ro* 'that person' [men^{1} dřo].

Note in particular the many clusters of *b* followed by obstruents. *b* is the only stop which does this. It also is the only stop that occurs as the second member of clusters beginning with *k* and *g*.

Table 2: Examples of two-consonant clusters in the onset

pr	prob	'poor' (from regional Sp. *probe*)
pw	pwert^{2}	'port' (from Sp. *puerto*)
tm	tmaǯ	'Thomas' (from Sp. *Tomás*)
tl	tlak^{4}	'tree sp.'
tr	tren	'train' (from Sp. *tren*)
kb	kba^{4}	'vapor'

kl	klas^{2}	'type' (from Sp. *clase*)
kr	krus	'cross' (from Sp. *cruz*)
$k^{w}l$	$k^{w}liž$	'mustard'
bt	bto$^{?}$s^{3}	'aqueduct'
bk	bkun^{3}	'kind of tortilla'
bk^{y}	$bk^{y}a^{?2}$	'necklace'
bk^{w}	$bk^{w}al^{2}$	'corn husk' (only example found to date)
bd	bdu$^{?2}$	'banana'
bc	bcaz^{2}	'gourd strainer'
bč	bči^{4}	'fruit of cactus sp.'
bč̣	bč̣u$^{?}$š^{3}	'tomato'
bǰ	bǰik^{2}	'cup on pole to cut fruit' (only example found to date)
bs	bsu$^{?3}$	'adobe'
bš	bšit^{4}	'ditch'
bz	bza$^{?2}$	'bean'
bẓ̌	bẓ̌il^{4}	'spark'
bn	bni$^{?}$l^{3}	'sunflower'
bl	blu$^{?2}$	'cave'
br	brun^{3}	'prickly pear fruit'
by	bya$^{?3}$	'prickly pear cactus'
bw	bwi^{2}	'guava'
dy	dyuẓ̌	'hello' (from Sp. *adiós*)
gb	gbiz^{4}	'day'
gr	gro$^{?}$l	'half'
gw	g-wi$^{?2}$	'POT-see'[8]
gy	g-ya^{4}	'POT-go'
$g^{w}z$	$g^{w}ze^{?}y$	'male'
$g^{w}n$	$g^{w}na^{?4}$	'female'
$g^{w}y$	$g^{w}yu^{?}$	'one hundred'
fw	fwer^{2}	'outside' (from Sp. *afuera*)
st	s-te	'again'

[8]Clusters of *gw* and *gy* are phonetically identical to the phonemes g^{w} and g^{y} respectively but are treated as consonant clusters here because they occur across morpheme boundaries.

sk	s-ka$^{?4}$	'FUT-write'
sk^{y}	s-k^{y}e^{3}	'FUT-roast'
sk^{w}	sk^{w}el	'school' (from Sp. *escuela*)
sb	s-ba$^{?}$n^{4}	'FUT-rob'
sč	s-čil^{2}	'FUT-untie'
sn	s-ni$^{?4}$	'FUT-speak'
sl	s-la$^{?4}$	'FUT-do'
sr	s-ru$^{?4}$	'FUT-leave'
sy	s-ya^{4}	'PRG-go'
sw	s-wi$^{?2}$	'FUT-see'
šp	špit	'nose of'
št	što$^{?}$	'head of'
šk	škil'ǰink	'cricket'
šk^{y}	š-k^{y}æt^{4}	'tortilla of'
šk^{w}	šk^{w}en	'finger of' (only example found to date)
šb	š-bay^{3}	'shawl of'
šc	š-ca^{4}'k^{w}et^{2}	'basket of'
šs	ššæ$^{?4}$	'dinner'
šm	š-meǰ^{4}	'seed of'
šn	šna$^{?}$	'mother of'
šl	šla$^{?3}$	'fever'
šy	šyag	'grandchild of'
šw	šwak^{2}	'cockroach'
mt	mte$^{?}$d^{3}	'bee fly'
mk	mku$^{?}$ǰ^{3}	'bee hive'
mb	mbud^{2}	'funnel'
md	mdun^{4}	'dust devil'
mg	mgin^{2}	'bird'
mg^{y}	mg^{y}e$^{?}$y^{2}	'man'
mc	mca$^{?3}$	'casserole dish'
mč	mčiz^{4}	'squirrel'
mč	mčunk^{4}	'tree trunk' (only example found to date)
mǰ	mǰin^{3}	'deer' (only example found to date)
ms	msi$^{?4}$	'hawk' (only example found to date)
mš	mšog^{4}	'rhinoceros beetle'
mz	mzæd^{3}	'machete'
mž	mžig^{3}	'pine cone'
ml	mlenč^{3}	'mosquito'
mr	mre^{4}	'ant'
my	mya$^{?}$k^{4}	'raven'

nt	ntos^{4}	'evil'
nk	n-ka$^{?4}$	'UNR-write'
nk^{y}	n-k^{y}e^{3}	'UNR-roast'
nk^{w}	nk^{w}æ$^{?}$t^{4}	'deaf person'
nd	ndal^{1}	'many'
ng	ngup^{4}	'armadillo'
ng^{y}	ng^{y}ed^{3}	'chicken'
ng^{w}	ng^{w}a$^{?}$n^{2}	'chili plant'
nc	n-cæ$^{?4}$	'UNR-close'
nč	n-čil^{2}	'UNR-untie'
nc̣	n-c̣ug^{4}	'UNR-cut'
nǰ	nǰi$^{?}$b^{3}	'smooth'
ns	n-se$^{?}$d^{4}	'UNR-learn'
nš	n-s̱ob^{3}	'UNR-set'
nz	nza$^{?}$p^{4}	'girl'
nž	nz̤en^{2}	'wide'
nl	nlo$^{?4}$	'red'
ny	nya^{3}	'hand of'
nw	n-wi$^{?2}$	'UNR-see' (only example found to date)
lb	lbey^{3}	'spider web'
lg^{y}	lg^{y}e$^{?}$y^{4}	'market'
lš	lše^{2}	'medicinal herb sp.' (only example found to date)
lz	lza$^{?}$	'spouse'
lm	lmet^{2}	'glass bottle' (from Sp. *limeta*)
ln	lni^{4}	'fiesta' (only example found to date)
ly	lyu^{4}	'land, earth'
rt	r-to$^{?4}$	'HAB-sell'
rk	r-ka^{3}	'HAB-buy'
rk^{y}	r-k^{y}e^{3}	'HAB-roast'
rb	r-ba$^{?}$n^{4}	'HAB-rob'
rd	r-da$^{?2}$	'HAB-crawl'
rg	r-ge$^{?}$b^{2}	'HAB-scrub'
rg^{y}	r-g^{y}e$^{?}$j^{2}	'HAB-hug' (only example found to date)
rc	r-cæ$^{?4}$	'HAB-close'
rč	r-čil^{2}	'HAB-untie'
rc̣	r-c̣ug^{4}	'HAB-cut'
rǰ	r-ǰe^{2}	'HAB-fear'
rs	rsil^{3}	'morning'
rš	r-s̱al^{3}	'HAB-open'
rz	rzæ$^{?}$	'late'
rž	r-z̤o$^{?}$n^{2}	'HAB-run'

rm	rmed	'remedy' (from Sp. *remedio*)
rn	r-ni$^{?4}$	'HAB-speak'
rl	r-la$^{?4}$	'HAB-do'
ry	r-ye^{1}	'HAB-search for'
rw	r-wi$^{?2}$	'HAB-see'
yt	y-to$^{?4}$	'POT-sell'
yk	y-ka^{3}	'POT-buy'
yk^{y}	y-k^{y}e^{3}	'POT-roast'
yb	yba$^{?4}$	'sky'
yd	ydo$^{?4}$	'church building'
yg	y-ga$^{?}$s^{4}	'POT-blacken'
yg^{y}	y-g^{y}e$^{?}$ǰ^{2}	'POT-hug' (only example found to date)
yc	y-cæ$^{?4}$	'POT-close'
yč	y-čil^{2}	'POT-untie'
yč̣	y-č̣ug^{4}	'POT-cut'
yǰ	y-ǰe^{2}	'POT-fear'
ys	y-se$^{?}$d^{4}	'POT-learn'
yš	yšu$^{?}$n^{4}	'Tlacolulita'
yz	yzæ$^{?4}$	'Tehuántepec'
yẓ̌	yẓ̌e	'tomorrow'
yn	y-ni$^{?4}$	'POT-speak'
yl	yla^{4}	'rust'
yr	yre$^{?4}$	'Quioquitani'
wt	w-to$^{?4}$	'COM-sell'
wk	wkit^{4}	'game'
wk^{y}	w-k^{y}e^{3}	'COM-roast'
wd	w-de$^{?2}$	'COM-give'
wg	w-git^{4}	'COM-play'
wg^{y}	w-g^{y}e$^{?}$ǰ^{2}	'COM-hug' (only example found to date)
wc	w-cæ$^{?4}$	'COM-close'
wč	wče	'a moment ago'
wč̣	w-č̣ug^{4}	'COM-cut'
wǰ	w-ǰe^{2}	'COM-fear'
ws	w-se$^{?}$d^{4}	'COM-learn'
wš	w-šob^{3}	'COM-set'
wz	wzæ$^{?}$	'afternoon'
wẓ̌	w-ẓ̌o$^{?}$n^{2}	'COM-run'
wn	wna$^{?4}$	'woman'
wl	w-la$^{?4}$	'COM-do'
wr	w-ru$^{?4}$	'COM-leave'
wy	w-ya^{3}	'COM-dance'

6.4 Sonority slope in consonant clusters

Greenberg (1978:261) states, "There is a voiced center of the syllable consisting of the vowel and possible successive preceding and following voiced consonants but that voicing is normally confined to this nucleus, i.e., that voicing is not interrupted and resumed within the same syllable." He concludes (p. 270), "In relation to the peak of the syllable, combinations are favored in which sonants are closer to the peak than obstruents and in which voiced consonants are closer to the peak than unvoiced." Bell and Saka (1983:259) subsequently generalized this sonority constraint, stating, "It is well established that languages overwhelmingly prefer initial clusters with a rising slope of sonority." They rank sonority on a scale in which stops are the least sonorous, with sonority increasing through fricatives, nasals, laterals, and rhotics to semivowels, the most sonorous of the consonants. Clusters in which a sonorant consonant is followed by a less sonorant consonant are called "reversed clusters" and are said to be uncommon. Further, where reversed clusters do occur, "they nearly always occur in a given language only in addition to clusters with the segment classes in preferred order" (Bell and Saka 1983:259).

In QZ, however, we find that 97 of the 147 consonant clusters found in native QZ words are reversed clusters. This is 66% of the total. Of these, only 23 have a matching pair in the "preferred order."

It should be noted that in this paper, *b* is considered a stop. It could as easily be considered a fricative since it occurs in that form more often than as [b] (See section 3.1.4). If *b* were treated as a fricative, 104 of the 147 consonant clusters (71%) would be reversed. Of these, only 24 would have a matching pair in the "preferred order."

Many of the unusual consonant clusters in QZ can be explained by the QZ tendency toward monosyllabic words. This tendency is seen clearly in Spanish loanwords. Typically, only the stressed syllable of the Spanish word is retained. Only some of the consonants of the unstressed syllables remain. For example, the Spanish word *manzana* [man'sana] 'apple' was adopted into QZ as *mzan*.

Many words which are polysyllabic in other Zapotec languages have been reduced to one-syllable words in QZ by the same process, as seen in (47).

(47) Examples comparing Isthmus Zapotec words with QZ words[9]

Isthmus Zapotec		QZ
gu'na$^{?}$	'woman'	wna$^{?4}$
'mani 'wi$^{?}$ni$^{?}$	'bird'	mgin^{2}
la'ni	'fiesta'	lni^{4}

'mani is the Isthmus Zapotec word for animal. The QZ word for animal is *ma*$^{?2}$. One might propose that an abbreviated form of this occurs in many QZ words for animals and accounts for most of the reversed consonant clusters with initial *m*. A few of the many QZ animal words beginning with *m-* are given in (48).

(48) mčiz^{4} 'squirrel'
mæ$^{?}$l^{2} 'snake'
mg^{y}ez^{3} 'mosquito'
mlag^{3} 'butterfly'

Bell and Saka (1983:259) also state that "The most extreme class of reversed clusters are those which begin with a semivowel," and that these are "exceedingly rare." However, in QZ we find that 35 of the reversed clusters begin with semivowels. Many of these are verb roots or other word classes preceded by the aspect markers *y-* 'POT' and *w-* 'COM' (see section 6.5). Jaeger and Van Valin (1982) describe similar consonant clusters beginning with the semivowel *w* in Yatee Zapotec. In other Zapotec languages (for instance Isthmus Zapotec) these aspect markers sometimes appear as *gi-* 'POT' and *gu-* 'COM' and are full syllables in themselves (Pickett 1988). In QZ the potential aspect before a vowel-initial root is marked by *g-*. It seems likely that unstressed vowels were present in these two aspect markers in an earlier form of Zapotec and were lost through a process of desyllabification.

6.5 *y* and *w* before other consonants

The semivowels *y* and *w* frequently occur in word-initial positions before other consonants. Phonetically, *y* and *w* sound like unstressed vowels, [i] and [u], before a consonant. (They are sometimes voiceless; see section 3.4.) However, when native speakers hum these words, they hum them as only one syllable. Thus, the words *y-ǰe*^{2} 'POT-fear' and *w-ǰe*^{2} 'COM-fear' sound the same as *ǰe*^{2} 'day' when hummed. Also, only one tone can be assigned to such a word. For these reasons, I treat them as monosyllabic words. For example:

[9]Isthmus Zapotec examples, from Pickett 1988, have been written phonemically for ease of comparison.

(49) [i'ni:$^{?4}$] = y-ni$^{?4}$ 'POT-speak'
[u'ni:$^{?4}$] = w-ni$^{?4}$ 'COM-speak'

Words in which *y* and *w* precede other consonants and are not functioning as aspect markers are also hummed as one syllable. For example:

(50) [i'do:$^{?4}$] = ydo$^{?4}$ 'church'
[u'na:$^{?4}$] = wna$^{?4}$ 'woman'

When a cluster with an initial semivowel is preceded by the possessive prefix, *š-*, we might expect the epenthetic vowel *a* following *š-*. The expected sequences *ay* and *aw* do not occur, however; instead, *i* and *u* occur, respectively, as seen below.

(51) š + ydo$^{?4}$ 'church' = [ši^{4}'do:$^{?4}$]
š + wna$^{?4}$ 'woman' = [šu^{4}'na:$^{?4}$]

These possessed words are hummed as two syllables and a tone is assigned to each of the two syllables.[10] When these two words are pronounced excessively slowly, the epenthetic vowel *a* or *e* is sometimes pronounced.

(52) [šey^{4}'do:$^{?4}$] [šaw^{4}'na:$^{?4}$]

6.6 Three-consonant clusters

The following clusters of three consonants have been found in syllable onsets. There are only one or two words which have each of these consonant clusters. Notice that each cluster begins with the consonant *n*.

(53)	ngb	ngba$^{?}$n^{2}	'thief'
	ngb	ngbiz^{4}	'sun'
	ngz	ngze$^{?}$y	'mister'
	ng^{w}z	ng^{w}zan	'certain relatives'
	ng^{w}z	ng^{w}zi$^{?2}$	'thunder'
	ng^{w}l	ng^{w}la$^{?}$z^{2}	'frog'
	ng^{w}l	ng^{w}læ$^{?4}$	'blind person'
	ng^{w}r	ng^{w}reg^{3}	'small lizard'
	nwč	nwčeč^{2}	'iguana'
	nwš	'nwšider	'acorn woodpecker'
	nwš	nwšu^{3}	'grains that form on a corn flower'

[10]The tone of the epenthetic vowel is always low, as can be seen in the following example where the root is a high tone: *š + yla$^{?2}$* 'caterpillar' = [ši^{4}'la$^{?2}$]

It is likely that all of these words are the result of the tendency of QZ to reduce words to one syllable. Compare the three examples from QZ with Isthmus Zapotec in (54) (examples from Pickett 1988).

(54)	QZ		Isthmus Zapotec
	ngbiz^{4}	'sun'	gu'biĭa
	ng^{w}reg^{3}	'small lizard'	gu'ragu?
	nwčeč^{2}	'iguana'	gu'čači?

6.7 Final consonant clusters

The following consonant clusters have been found in syllable-final position. These consonant clusters are not very common. We have found only one or two examples of each. Not included are consonant clusters formed when the negative suffix *-d* (with allomorph *-t*) follows a verb.

(55)			
	nt	ryent^{2}	*'mescal'* (from Sp. *aguardiente* 'rum')
	nk	šķil'ĭink	'cricket'
	nč	mlenč^{3}	'mosquito'
	ns	ku''tens^{3}	'sack'
	lt	mtilt^{3}	*'jícama'* (snow potato)
	ys	ge$^{?}$ys^{4}	'sleep' (compounding form)

ABBREVIATIONS

COM	completive aspect
FUT	future aspect
HAB	habitual aspect
IMP	imperative aspect
POS	possessive
POT	potential aspect
PRG	progressive aspect
QZ	Quiegolani Zapotec
sp.	species
Sp.	Spanish
ST	stative aspect
UNR	unreal aspect

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